



New record of the Endangered Black-bellied Tern, *Sterna acuticauda* J.E. Gray 1831, from Tungabhadra River at Siruguppa, Bellary, Karnataka, India

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Abstract

Black-bellied Tern, *Sterna acuticauda* J.E. Gray, 1831, is an Endangered species currently restricted to a few patches along the major rivers and lakes in the Indian subcontinent. I report it from Tungabhadra River at Siruguppa for the first time. Five individuals in breeding plumage were observed at a 6 km stretch of river, sampled using line transect method. Previous records, with this new locality, suggest that the population of Black-bellied Tern could be fragmented. This new site could be a promising breeding ground for the species; nevertheless, it is under threat owing to uncontrolled sand mining.

Keywords

Conservation, fragmentation, sand mining, subpopulation

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Introduction

Black-bellied Tern, *Sterna acuticauda* J.E. Gray, 1831, is one of the nine *Sterna* species so far reported from India (Rasmussen and Anderton 2005). It has a wide geographical distribution across many countries of South-East Asia (Kar et al. 2018) and is considered to be native to India, Bangladesh, Pakistan, Nepal, Myanmar, Laos, Cambodia, and southern China. It is a non-migratory species that breeds along the shores the freshwater bodies such as large lakes and rivers (Ali and Ripley 1983). During the breeding season, it develops conspicuous black color on its belly which gives the species its common name. It also develops a black cap and a deep orange beak in the breeding season between February and April (Grimmett et al. 2011). It breeds along the banks of major inland bodies of freshwater, including rivers, and lays

2–4 camouflaged eggs in pit holes in sand or mud. Black-bellied Terns neither construct conspicuous nests nor do they breed in colonies, but they share breeding areas with other wader species especially River Tern (*Sterna aurantia* J.E. Gray, 1831), Small Pratincole (*Glareola lactea* Temminck, 1820), and Indian Skimmer (*Rynchops albi-collis* Swainson, 1838).

Although, Black-bellied Tern is believed to be distributed throughout many countries in South-East Asia, it is now extinct from most of its range (Sykes 2010; Rahmani et al. 2014; BirdLife International 2017). It currently has sparse distribution in India, Bangladesh, Nepal, Pakistan, and Myanmar. There are less than 100 individuals reported in three countries, namely India (57), Nepal (eight), and Myanmar (seven) (Mundkur et al. 2017).

This species was sighted from Bangladesh prior to 2011, whereas a recent survey indicated only unconfirmed records from that country (Chowdhary et al. 2014). A survey for the species along the Chindwin and Ayeyarwady rivers in Myanmar showed a breeding population of 12 and 14 individuals, respectively, with nests and fledglings (Lin 2018). Ali and Akhtar (2005) reported 328 individuals of Black-bellied Tern from various sites in Pakistan; however, no more published records have been available since except a report of eight individuals from one location along the Chenab River in that country (Altaf et al. 2018).

In India, Black-bellied Tern has been reported from states of Delhi, Haryana, Madhya Pradesh, Bihar, Uttar Pradesh, Assam, Arunachal Pradesh, Maharashtra, Andhra Pradesh, Karnataka, and Kerala. Although this species occurs in many states, trends in its population are known only partially (Kar et al. 2018). It showed very low occupancy in the Chambal River in Rajasthan and Uttar Pradesh and, similarly, at Mahanadi in Odisha (Rahmani 2012). There are multiple sightings in Odisha, for example: at Chilika Lake, Bhitarkanika National Park, Chandaka Wildlife Sanctuary, Hirakud Reservoir, Satakosia Gorge, Mundali on the Mahanadi River, and the Samal reservoir on the Brahmani River (Gopi and Pandav 2007; Palei and Mohapatra 2011; Palei 2015). In 2018, small breeding populations were recorded at various sites along the Mahanadi River. These consistent reports from Odisha could make it one of the most promising Indian states for this species' survival. There were multiple sites reported from Maharashtra from the districts of Pune, Mumbai, Raigad, and Chandrapur between the years 2000 and 2015; however, the number of individuals from these sites is unknown (Pawar and Damle 2015).

The species is also reported from southern India, although sporadically. Black-bellied Tern has been reported from a few localities in Andhra Pradesh, Kerala, and Karnataka (Aarif 2010), where this species may continue to exist. There are multiple informally published records of the species from these states. According to Thirumalai et al. (2013), Black-bellied Tern is extant in the state of Karnataka, but precise geographical locations and the numbers of individuals are unobtainable. According to eBird India data, the species has been recorded from Karnataka, especially from Haveri, rural Bengaluru, Mysore, Bidar, and Shivamogga. There are more than 1400 records throughout the country documented by eBird India; however, many of these records are lack information on population numbers, precise geographical location, and local threats.

Although these records are only spot records, they are crucial and noteworthy as the species is Endangered showing rapid decline.

There is a critical need to investigate Black-bellied Tern across India to understand its distribution, demography, ecology, and threats, which are necessary for species recovery programs. Every new occurrence record

is thus a necessary contribution to determine its precise distribution and the connectivity of its fragmented population. Also essential is knowledge of threats for each subpopulation. I report here a new locality of Black-Bellied Tern from Karnataka, with notes on this species' population, behavior, and threats.

Methods

On 3 March 2019, I opportunistically observed two individuals of Black-bellied Tern flying across the Tungabhadra River at 15. 5562°N, 076.8242°E (GPS accuracy = ± 15 m, datum used WGS84) (Figs 1, 2). To understand more about its local distribution and population, I sampled more systematically along the river. I divided a 6 km long accessible stretch into six 1 km parts, treating each as independent transects. The total stretch of river was continuous in that there were no gaps between six transects. I surveyed alternate transects on each day to minimize redundancy in the sampling. I conducted sampling between 07h00–10h00, 13h00–15h00, and 16h00–18h00 for 2 days (i.e. 4–5 March 2019). Accordingly, each 1 km transect was visited thrice in the two days, for a total transect length of 18 km and 42 hours of observations. On 6 March 2019, the entire 6 km stretch was sampled continuously to obtain natural history and behavioral observations.

For every sighting, flock size (i.e. number of individuals observed simultaneously) was carefully recorded. Black-bellied Tern was often observed with River Tern, but for quantifying flock size I counted individuals of only Black-bellied Tern.

I categorized activity of the focal individual or flock into flying, perching, or foraging. I observed each focal



Figure 1. Black-bellied Tern sighted at Tungabhadra River, Siruguppa, Bellary, Karnataka.

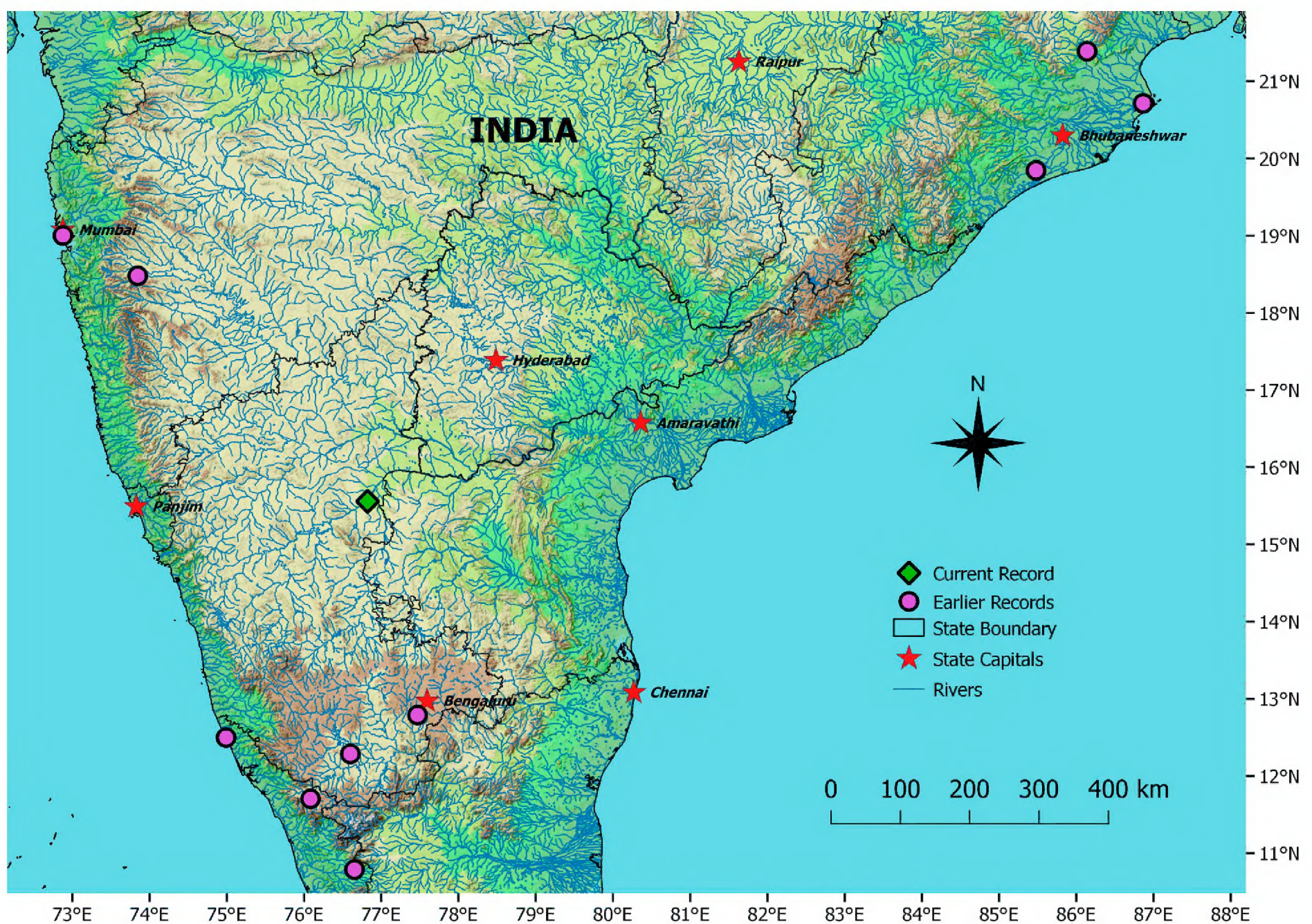


Figure 2. Map of occurrences of Black-bellied Tern in India. Green diamond = new record along the Tungabhadra River, Siruguppa, Karnataka. Pink circles = previous records.

flying individual for 15 minutes or until it moved out of sight, whichever occurred first. I only recorded the geographic coordinates where the individual was first spotted and did not record the subsequent coordinates of the same individual. The population estimates are based on all three activity categories observed on 4–5 March 2019. The behavioral observations, however, were mainly obtained from perching and foraging individuals which were observed for 13 behavioral bouts of 10 minutes each with a gap of 5 minutes between two consecutive bouts. Behavioral observations included this species' foraging and interactions with other species.

Results

Order Charadriiformes

Family Laridae

Genus *Sterna* Linnaeus, 1758

Sterna acuticauda J.E. Gray, 1831

New records. INDIA • 3 individuals, sex undetermined; Karnataka state, Siruguppa, Tungabhadra River; 15. 5465°N, 076. 8173°E; alt. 371 m; 4 Mar. 2019. • 2 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5611°N, 076. 8344°E; alt. 371 m; 4 Mar. 2019. • 3 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5706°N, 076. 8358°E; alt.

371 m; 4 Mar. 2019. • 2 individuals; sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5855°N, 076. 8358°E; alt. 371 m; 4 Mar. 2019. • 3 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5359°N, 076. 8139°E; alt. 371 m; 5 Mar 2019. • 3 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5505°N, 076. 8215°E; alt. 371 m; 5 Mar 2019. • 3 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5542°N, 076.8313°E; alt. 371 m; 5 Mar 2019. • 3 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5629°N, 076. 8358°E; alt. 371 m; 5 Mar 2019. • 2 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5705°N, 076.8363°E; alt. 371 m; 5 Mar 2019. • 3 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5795°N, 076. 8376°E; alt. 371 m; 5 Mar 2019. • 2 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5341°N, 076. 8132°E; alt. 371 m; 6 Mar 2019. • 5 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5509°N, 076. 8217°E; alt. 371 m; 6 Mar 2019. • 1 individual, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5539°N, 076. 8262°E; alt. 371 m; 6 Mar 2019. • 3 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5695°N, 076. 8360°E; alt. 371 m; 6 Mar 2019. • 2 individuals, sex undetermined; Karnataka, Siruguppa, Tungabhadra River; 15. 5817°N, 076.8366°E; alt. 371 m; 6 Mar 2019.

Identification. Black-bellied Tern was identified in field by its medium-sized body; deeply forked tail; glossy, black forehead, crown, crest, and nape; and, most importantly, conspicuously black belly and red-orange beak in all the individuals (Fig. 1). River Tern shares the habitat with Black-bellied Tern but has a yellow beak and lacks the black belly. Whiskered Tern, *Chlidonias hybrida* (Pallas, 1811), in breeding plumage might be confused with Black-bellied Tern, but it has short and almost square-ended tail and lacks the conspicuous, orange-red beak.

Remarks. About 1–5 individuals (mean flock size 2.2 ± 1.3 SD) per km stretch were observed during the survey. Species could not be distinguished to an individual level, but for one instance, five individuals were seen foraging together. Apart from this, two other individuals lacking the black belly but having all other characteristics of Black-bellied Tern and another three individuals having black crown, black eye stripe, forked tail, and orange beak were not included in the population estimate. These individuals may represent variation in the adult plumage and juveniles, respectively; nevertheless, they could not be identified to species level with certainty, and hence they were ignored.

Individuals of Black-bellied Tern were found in close association with River Tern and Small Pratincole while foraging. Although these three species formed a closely packed flock, all species foraged individually and independently. Black-bellied Tern foraged primarily on small fishes in the shallows as well as deeper areas of the river. Black-bellied Tern preferred perching on bare rocks in the river flow and also on sandy banks. They were not seen perching on trees along the riverbed. Black-bellied Tern shared habitat for breeding with other resident avian species, including River Tern, Small Pratincole, and Little Ringed Plover (*Charadrius dubius* Scopoli, 1786). Black-bellied Tern was sighted equally frequently at all times in the survey. However, they were seen foraging more frequently in the morning but perching and preening in the afternoon and evening.

Informal conversation with locals and direct observations during the study revealed that human activity is high in the riverbed of the study area. There was a continued removal of sand by the local people. The excavation of sand was evidently highest in the early morning when 7–12 bullock carts (each having capacity of carrying 30–40 kg of sand, as reported by locals) was hauled away from probable nesting sites of Black-bellied Tern. The local people appeared to be aware of the occurrence of some conspicuous avian species (both resident and migratory) but lacked any awareness that these species are threatened.

Discussion

Black-bellied Tern is reported for the first time from the Tungabhadra River in Siruguppa. As occurrence records of this species are sparse across India with little

information on population numbers, it is worth reporting this species from a new locality. This new finding is perhaps an outcome of the minimal attention to the biodiversity of Tungabhadra River, which is understudied possibly because it is neither part of any network of protected areas or wetlands nor widely recognized for bird-watching activities (e.g. Bassi et al. 2014; Ramsar List 2020).

I did not find any active nests or remains of nests but did observe some sandpits with broken eggshells which resembled the description by Ali and Ripley (1981) and Kar and Debata (2019). Having observed five individuals in their breeding plumage implies that there might have been some nesting activity in the study area, but this needs to be confirmed by an extensive survey.

Black-bellied Tern occurs sporadically throughout India. There are no studies on its demography which can confirm presence of any continuous population (SoIB 2020). This may indicate that the population in India could also be severely fragmented. It is observed that there is a continuous decline in number of mature individuals throughout its native range including India (Perennou et al. 1994; BirdLife International 2017). The global population is roughly estimated to be between 6700 and 17000 mature individuals. Nevertheless, the IUCN Red List assessment suggests a need for more precise data on its distribution and population throughout its global range (BirdLife International 2017). Consequently, these new records of *Sterna acuticauda* with preliminary notes on its population could be a small but important contribution in filling a knowledge gap.

This species is suspected to be facing increased population decline owing to diverse unforeseen factors (BirdLife International 2017). Nest predation, egg harvesting by people, unnatural flooding, pollution, and livestock grazing in nesting areas are said to be the primary causes of the decline and displacement of this species (Goes et al. 2010; Kar and Debata 2019). An additional threat is the extensive sand and gravel extraction, which I observed in the study area may lead to reduced nesting success. Extraction of sand, especially from islands and sandpits in the river has been shown to leave eggs and nestlings uncamouflaged, which has caused direct loss of individuals (Ali and Ripley 1981; Kar and Debata 2019). There are no reports of the poaching of adults or eggs from the study area, but sand mining would certainly cause disturbance to eggs and hatchlings.

Black-bellied Tern is perhaps not recognized as a flagship species, but it certainly needs legal protection wherever it occurs. It has recently been listed as one the most important species by the National Mission for Clean Ganga (Department of Water Resources, River Management and Ganga Rejuvenation, Government of India), which extends its projects to river and wetland conservation in India. Awareness about the presence of threatened species, such as Black-bellied Tern, in Siruguppa has indeed made many local people be conscious and interested in knowing more about the species. I

hope that there may be future exploration for the species and actions taken to preserve the habitat and minimize disturbance.

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